

WE CLAIM:

1. A system for treating plants containing biopolymers, comprising:
 - one or more repellent chemicals; and
 - one or more polymers, the polymers forming a matrix with the biopolymers and the repellent chemicals to permit sustained release of the chemicals.
2. The system of claim 1, wherein the one or more repellent chemicals comprise synthetic organic, inorganic, biochemical, pharmacological and toxicological substances.
3. The system of claim 2, wherein the one or more repellent chemicals are derived from marine life, insect life, mammalian tissues, cellular life forms, and artificial and natural life forms.
4. The system of claim 1, wherein the one or more repellent chemicals comprise plant-derived materials.
5. The system of claim 1, wherein the one or more repellent chemicals is in the form of a powder and the one or more polymers is in the form of a liquid.
6. The system of claim 1, wherein the one or more polymers comprise naturally occurring hydrophilic polymers.
7. The system of claim 6, wherein the hydrophilic polymers are selected from the group consisting of collagen, gelatin, dextrin and polypeptides.
8. The system of claim 1, wherein the one or more polymers comprise a charged ion, said charged ion forming an ionic complex with the one or more repellent chemicals.
9. The system of claim 8, wherein the charged ion is a silver ion.
10. The system of claim 1, wherein the one or more polymers comprise synthetic polymers.
11. The system of claim 10, wherein the synthetic polymers are selected from the group consisting of self-assembled monolayers and a water insoluble amphiphilic polycation molecule.

12. The system of claim 1, wherein the one or more polymers comprise one or more natural, water-soluble polymers and resins selected from the group consisting of gums, guar gums, xanthan gums, starches, dextrans, proteins, celluloses, polysaccharides, dextrans, carrageenan, agar, alginates, gelatin, casein, pectin, soy bean, lignites, tannins, deoxyribonucleic acid and animal derivatives.
13. The system of claim 1, wherein the one or more polymers comprise one or more synthetic, water-soluble polymers selected from the group consisting of polyvinyl alcohol, hydroxypropyl cellulose, maleic anhydride copolymers, polyacrylates, polyimines, polyethylene glycols, polyvinyl pyrrolidone, hydroxyethyl cellulose, hydroxypropylmethylcellulose, cellulose ethers, polyquaternary amines, modified polyesters, sodium carboxymethyl cellulose, hydrogels, acrylamide co-polymers, sorbitan esters and derivatives, polymeric surfactants, hydrocolloids, cationic polymers, anionic/nonionic polymers, and coagulating agents.
14. The system of claim 1, wherein the one or more polymers are bioerodible polymers.
15. The system of claim 1, wherein the one or more polymers are absorbable polymers.
16. The system of claim 1, wherein the one or more polymers are controlled release polymers.
17. The system of claim 1, wherein the one or more polymers are one or more high molecular weight, hydrophilic polymers.
18. The system of claim 1, wherein the one or more polymers are one or more high molecular weight, resorbable polymers.
19. The system of claim 1, wherein the one or more polymers are one or more hydrolytically and enzymatically degradable polymers.

20. The system of claim 1, wherein the one or more polymers are selected from the group consisting of carboxy methyl cellulose, a polyorthoester, pluronics, and a lactide-glycolide co-polymer.
21. The system of claim 1, wherein the one or more polymers comprise one or more of methyl cellulose and carboxy methyl cellulose.
22. The system of claim 1, wherein the one or more polymers comprise pluronic F-127.
23. The system of claim 1, wherein the one or more plant-derived, repellant chemicals comprise one or more alkaloids isolated from one or more members of the family Amaryllidaceae and the family Liliaceae.
24. The system of claim 1, wherein the one or more plant-derived, repellant chemicals comprise one or more alkaloids isolated from one or more members of the genus Narcissus.
25. A method for protecting vegetation, said vegetation containing biopolymers, comprising:
treating the vegetation with a combination of one or more repellant chemicals and one or more polymers,
wherein the polymers and the repellant chemicals form a matrix with the biopolymers of the vegetation to permit sustained release of the chemicals.
26. The method for protecting vegetation of claim 25,
wherein the one or more repellant chemicals are in the form of a powder and the one or more polymers are in the form of a liquid, and
wherein the treating the vegetation comprises successively depositing the repellant chemicals and the polymers.
27. The method for protecting vegetation of claim 26, wherein the one or more polymers are deposited in the form of microdrops.
28. The method for protecting vegetation of claim 25, wherein the one or more polymers comprise naturally occurring hydrophilic polymers.

29. The method for protecting vegetation of claim 28, wherein the hydrophilic polymers are selected from the group consisting of collagen, gelatin, dextrin and polypeptides.
30. The method for protecting vegetation of claim 25, comprising releasing the one or more repellent chemicals under a controlled steady rate.
31. The method for protecting vegetation of claim 30, wherein the releasing occurs without an initial burst effect.
32. The method for protecting vegetation of claim 25, further comprising controlling the adsorption and absorption kinetics of the transport of agrochemicals in and out of barrier surfaces of the plants and providing protection to the vegetation.
33. The method for protecting vegetation of claim 25, wherein the treating the vegetation comprises applying isobaric pressure in the range of about 100 to about 650 megapascals to the matrix.
34. The method for protecting vegetation of claim 33, wherein the pressure is applied for a time period in the range of about one to about twenty minutes.
35. The method for protecting vegetation of claim 33, wherein the pressure is applied at ambient temperature.
36. A method for treating the anthropogenic hydrophobic organic contaminants that pollute agricultural soils and natural waters, comprising using the system of claim 1.
37. The method for providing disease and insect control to protect wounded plant tissue and unwounded vegetation, including the outer skins, cuticular barriers and aerial surfaces of fruits, vegetables, seeds, and plants, by employing the system of claim 1, wherein the vegetation is resistant to pathogenic microorganism's attack, parasitic attack, chemical attack, and to environmental stress, rotting, water loss, and insect invasion.
38. The method for providing disease and insect control of claim 37, wherein the vegetation includes plant biopolymers, polymers, biopolyesters, biological solids and semi-solids,

suberin, crosslinked aliphatic and aromatic suberin domains, esterified glycerol, lignin, waxes, cutan, cutin, cuticular membranes, organic matter fractions in the soil and bulk organic matter.

39. A method for microbially inactivating the bioburden of vegetation, said vegetation containing suberin, lignin, and cuticular layers of plants and seeds, comprising:

treating the vegetation with a combination of one or more repellent chemicals and one or more polymers to form a matrix with the vegetation; and

applying isobaric pressure in the range of about 196 to about 981 megapascals to the matrix.

40. The method for microbially inactivating the bioburden of vegetation of claim 39, wherein the pressure is applied for a time period in the range of about 20 to about 120 minutes.

41. The method for microbially inactivating the bioburden of vegetation of claim 39, wherein the pressure is applied at a temperature in the range of about ambient to about 50°C.

42. A method for repelling animals from a surface, comprising:

forming a complex of repellent chemicals, biopolymer material, and one or more polymers;

applying the complex to the surface; and

releasing the chemicals to repel animals from the applied surface.

43. The method of claim 42, further comprising drying the complex after it is applied to the surface.

44. The method of claim 42, wherein the repellent chemicals comprise an alkaloid.

45. The method of claim 42, wherein the one or more polymers comprise carboxymethyl cellulose.

46. The method of claim 42, wherein the biopolymer comprises at least one of suberin, cutin, wax, lignin, cutan, and fatty esters.

47. The method of claim 42, wherein the surface is a non-tissue surface.
48. The method of claim 42, wherein the surface is a polymeric plastic material.